National Aeronautics and Space Administration
NASA Marshall Star: March 9, 2006 : Vol. 46/No. 24

MARSHALL STAR

Serving the Marshall Space Flight Center Community

March 9, 2006

Marshall scientists tracked mystery lightning inside 2005 hurricanes

By Patrick L. Barry and Dr. Tony Phillips

Thunder and lightning generally mean one thing: A storm is coming. Yet the biggest storms of all, hurricanes, are notoriously lacking in lightning.

But during the record-setting hurricane season of 2005, three of the most powerful storms — Rita, Katrina and Emily — did exhibit lightning. Lots of it. And scientists at the Global Hydrology and Climate Center,

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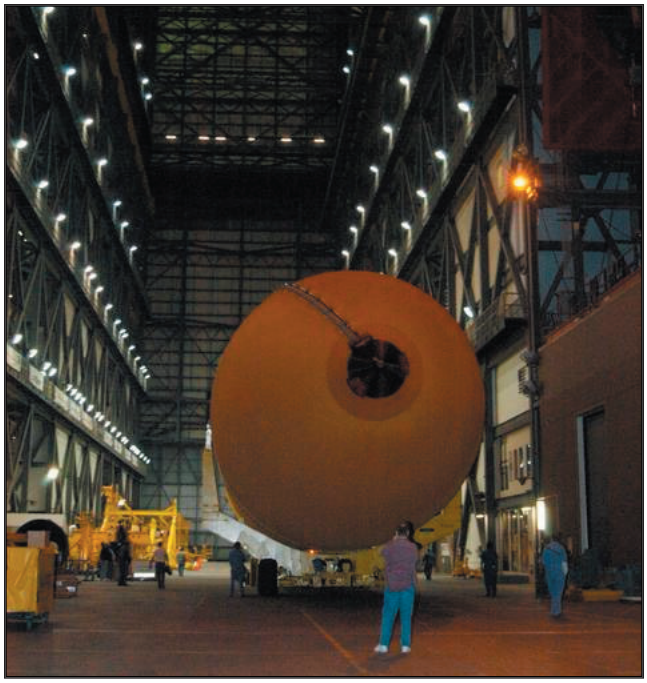
NASA/GSFC

NASA's ER-2 airplane leaves the Tropical Cloud Systems and Processes mission headquarters in San Jose, Costa Rica, preparing to chase Tropical Storm Dennis in July 2005.



NASA/KSC

NASA's space shuttle external tank arrives at Kennedy Space Center

The redesigned external fuel tank that will launch Space Shuttle Discovery on the next shuttle mission, STS-121, arrived at the Kennedy Space Center, Fla., last week. The tank was shipped from the Michoud Assembly Facility near New Orleans, traveling on a covered barge from the Mississippi River Gulf Outlet to Florida's Banana River. Upon arrival at the Kennedy Center, the tank was transferred to the Vehicle Assembly Building and lifted into a checkout cell for further work. The tank, designated ET-119, will fly with many major safety changes, including the removal of the protuberance air load ramps. The foam ramps were removed to eliminate a potential debris source during shuttle liftoff. NASA managers are targeting a launch window of May 2006.

New training helps Marshall's Instrument and Payload Systems Department define its destiny

By Lori Meggs

To foster dialogue among its stakeholders, the Marshall Center Engineering Directorate's Instrument and Payload Systems Department recently explored how to become an ideal organization through a method known as appreciative inquiry.

Appreciative inquiry helps stakeholders structure their future by reflecting on what has worked best in the past. The approach is a radical departure from traditional problem-solving models, which don't fully explore prior events.

"This experience has been tremendous in pulling ideas out of us and helping us clearly define our destiny as an organization," said Steve Pearson, manager of the department. "Appreciative inquiry has unleashed passion in us as individuals that has energized us and will have a great impact on our organization."

Pearson's department provides design-to-finished products for instruments and payloads used throughout NASA. These instruments and payloads are used for human space flight programs, science investigations and exploration initiatives.

Since early last year, Pearson has been in executive coaching with a consulting firm. He decided that many of the coaching methods he learned would be an excellent way to integrate new team members into the department.

For three days in January, managers, engineers, business professionals, staff employees and representatives from other Marshall organizations, along with internal and external customers, discussed positive ways to build on their strengths. They are developing action plans to make the Engineering Directorate's Instrument and Payload Systems Department function in the most efficient way possible.

NASA

Kathy Jones, right, an engineer in the Instrument and Payload Systems Department, discusses her team's results with Gayle Lantz during an activity for the appreciative inquiry training.

"This approach is ideal for organizations wanting to create cultural change," said Gayle Lantz, owner of the Birmingham-based organizational development consulting firm that conducted the training at Marshall. "It builds positive energy, encourages innovation and increases individual accountability for results."

This first use of the appreciative inquiry method at Marshall coincides with NASA's renewed emphasis on partnerships. As a result of the experience, participants have opportunities to build new relationships, strengthen their own partnerships and initiate change to move the department forward.

The writer, an ASRI employee, supports the Public and Employee Communications Office.

Improve communication skills by joining Lunar Nooners Toastmasters Club

Marshall team members who want to improve their communication skills are invited to visit The Lunar Nooners Toastmasters Club. The club meets at 11:30 a.m. each Tuesday in the Building 4610 cafeteria. For more information, call Bob Keener at 544-1159.

MARS soccer begins Thursday, March 23

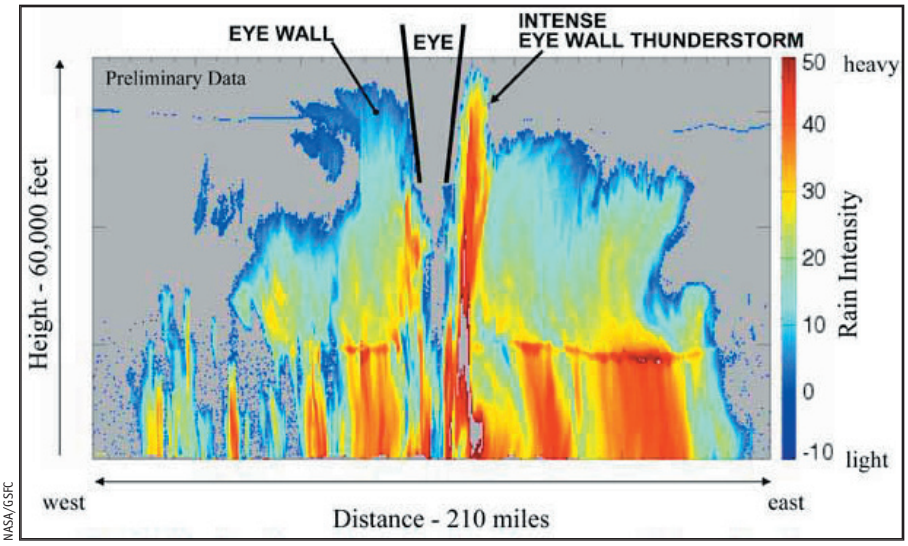
MARS soccer will start Thursday, March 23. Participation is open to all NASA employees and contractors. There will be informal pickup games prior to the start date. For more information, call Andy Heaton at 544-3839.

Hurricanes

Continued from page 1

who participated last July in NASA's Tropical Cloud Systems and Processes hurricane-tracking mission in Costa Rica, would like to know why.

NASA researcher Richard Blakeslee was on a science team from the climate center — part of the National Space Science and Technology Center in Huntsville — that explored Hurricane Emily last summer using NASA's ER-2 aircraft. Flying high above the storm, they noted frequent cloud-to-cloud and cloud-to-ground lightning in the cylindrical wall of clouds surrounding the hurricane's eye. In fact, the electric fields above Emily were among the strongest ever measured by the aircraft's sensors over any storm.



NASA/GSFC

A Doppler radar dissection of Hurricane Emily, taken from NASA's ER-2 plane on July 17, 2005, shows the violent structure and staggering size of the Category 4 hurricane.

"We observed steady fields in excess of 8 kilovolts per meter," Blakeslee said. "That is huge — comparable to the strongest fields we would expect to find over a large, land-based 'mesoscale' thunderstorm."

The 30-day Tropical Cloud Systems and Processes campaign united NASA, the National Oceanic and Atmospheric Administration and 10 U.S. universities to improve scientists' understanding of hurricanes. Blakeslee and other scientists traveled to San Jose, Costa Rica, where they could fly the ER-2 to storms in both the Caribbean and the eastern Pacific Ocean. They combined ER-2 data with data from other vehicles, satellites and ground-based sensors to get a comprehensive view of each storm.

Rita and Katrina were not part of the Costa Rica campaign. Lightning in those storms was detected by means of long-distance sensors on the ground, not the ER-2, so less is known about their electric fields.

Nevertheless, some similarities exist. All three storms were powerful. Emily was a Category 4 storm, while Rita and Katrina were Category 5. All three were over water when lightning was detected. And in each case, the lightning was located around the eye-wall.

NASA/Bill Ingalls

Pilot David Wright exits a support vehicle to prepare to board NASA's ER-2 high-altitude weather research aircraft.

The reason most hurricanes don't have lightning, Blakeslee said, is because "they're missing a key ingredient — vertical winds." Within thunderclouds, vertical winds cause ice crystals and water droplets called "hydrometeors" to rub together and gain an electrical charge, much like that acquired by walking across a wool carpet in socks. For reasons not fully understood, positive electric charge accumulates on smaller particles, while negative charge clings to the larger ones. Wind and gravity separate the charged particles, producing an enormous electric field within the storm and leading to lightning.

But hurricane winds are mostly horizontal, so the vertical churning required to create lightning rarely occurs.

"Hurricanes are most likely to produce lightning when they're making landfall," Blakeslee said. There, they encounter a phenomenon called "orographic forcing," or the upward movement of air when large storms hit mountainous terrain.

There were no mountains beneath the "electric hurricanes" of 2005, however — only flat water.

Blakeslee said the power and sheer violence alone of Emily, Rita and Katrina can't explain the phenomenon. "Other storms have been equally intense and did not produce much lightning," he said. "There must be something else at work."

Blakeslee and his fellow NASA, National Oceanic and Atmospheric Administration and university scientists continue to pore over the reams of data gathered in the Costa Rica campaign, searching for new answers — and ever mindful that the next hurricane season is a mere three months away.

The writers are the assistant editor and editor, respectively, of the Science@NASA Web site, which is sponsored by the Marshall Center's Science and Mission Systems Office. An expanded version of this story is available at www.science.nasa.gov.

Obituaries

Eugene Ivyl "Rosebud" Kirkland, 90, of Montgomery died Feb. 27. He retired from the Marshall Center in 1987 as a mechanical engineer. He is survived by one son, William A. Kirkland II; and one daughter, Louise K. Medley, both of Montgomery. A memorial service will be Saturday, March 11, at Mayfair Church of Christ in Huntsville.

Ralph Donald McNeely, 72, of Huntsville died Feb. 28. He retired from the Marshall Center in 1997 as an aerospace engineer. He is survived by his wife, Marie Watts McNeely; two daughters, Donna Karns of Merritt Island, Fla., and Kimberly McNeely of Huntsville; and one brother, Robert McNeely of Chattanooga, Tenn.

Joseph Clarence Mercier, 86, of Huntsville died Feb. 24. He retired from the Marshall Center in 1986 as an employee development specialist. He is survived by his wife, Jeannine Mercier; two sons, Joseph L. Mercier of Fredericksburg, Va., and Michael Mercier of Huntsville; two daughters, Diane Wiedmeier of Manson, Iowa, and Patricia Hearne of Huntsville; one brother, Donald Mercier of Orlando, Fla.; and two sisters, Beaulah Kemnitz and Virginia Waerzeggers of Green Bay, Wis.

Vincent Paul Bendel, 75, of Hazel Green died Feb. 20. He retired from the Marshall Center in 1985 as an aerospace engineering technician. He is survived by his wife, Ilene Bendel; one son, Larry Eakes; and one daughter, Paula Jones.

James E. Rhodes, 64, of Huntsville died Feb. 19. He retired from the Marshall Center in June 2002 where he worked in electronic instrumentation systems. Survivors include his wife, Betty Rhodes; two sons, James Darren Rhodes of Malibu, Calif., and Brett Rhodes of Auburn; and two daughters, Paige Winn of Suwanee, Ga., and Carol Kanemasu of Alpharetta, Ga.

Willie L. Shippey, 80, of Huntsville died Feb. 17. He retired from the Marshall Center in 1980 as an aerospace engineer. He is survived by his wife, Faith Nichols Shippey; one son, Roger Lee Shippey of Huntsville; two daughters, Nancy Shippey Rentschler of Birmingham and Lisa Shippey Martin of Matthews, N.C.; two brothers, David Shippey of Huntsville and Layler Rector of Dothan; and one sister, Cassie Evans of Covington, Tenn.

Lee Boyer James, 85, of Huntsville died Feb. 12. He retired from the Marshall Center in 1971 as director of program management and served as deputy director of the Apollo Program at NASA Headquarters in Washington. He is survived by his wife, Kathleen James; one son, Lee Boyer James Jr. of Coupeville, Wash.; and one daughter, Janet James Holland of Huntsville.

George Tovar, 77, of Huntsville died Feb. 7. He retired from the Marshall Center in 1990 as an engineer in aerospace flight systems. He is survived by his wife, Janie Tovar; one son, Duncan Tovar of Huntsville; one daughter, Melissa Mayville of Manassas, Va.; and three sisters, Cecilia Calderon, Marina Lopez and Eleanor Fonnegra, all of Bogotá, Colombia.

Carl Alan Fuller, 76, of Panama City Beach, Fla., died Feb. 4. He was retired from NASA. He is survived by his wife, Ellen Fuller; one son, Carl Alan Fuller Jr. of Decatur; one daughter, Susan Whitman of Atlanta; and one brother, Charles Fuller of Anniston.

Ralph Gurganus Diamond, 90, of Rome, Ga., formerly of Huntsville, died Jan. 26. He retired from the Marshall Center in 1973 as an aerospace engineering technician. He is survived by his wife, Irene Duke Diamond; one daughter, Cindy Diamond of Stone Mountain, Ga.; and one sister, Ann Moak of Jackson, Miss.

Cortes Lee Perry, 72, of Huntsville died Jan. 19. He retired from the Marshall Center in 1984 as an engineer in basic properties of materials. He is survived by one brother, Henry Perry of Columbus, Ind.

Lester Katz, 74, of Huntsville died Jan. 15. He retired from the Marshall Center in 1981 as an engineer in measurement and instrumentation. He is survived by one son, Dr. Daniel Katz of Huntsville; and one daughter, Debbie Woodward of Gallatin, Tenn.

Campbell Gentry Miles Jr., 81, of Huntsville died Jan. 14. He retired from the Marshall Center in 1980 as an engineer in technical management. He is survived by his wife, Clara B. Miles; one son, Charles Gentry Miles of Birmingham; one daughter, Marcia Miles Buring of Huntsville; one brother, Thomas Walter Miles of Waynesville, N.C.; and one sister, Mary Alice Miles of Nashville, Tenn.

Robert "Bob" Caves Edwards, 77, of Huntsville died Jan. 11. He retired from the Marshall Center in 1981 as a flight systems engineer. He is survived by his wife, Sylvia S. Edwards; one son, R. Greg Edwards of Decatur; five daughters, Robin E. Jones, Reb Engle, Melanie E. Bernal and Elizabeth D. Reid, all of Huntsville, and Lisa A. Edwards of New Orleans; and one sister, Gene E. Honaker of Shreveport, La.

Julie Lorene Lower, 46, of Decatur died Jan. 10. She was employed at the Marshall Center as a mechanical engineer. She is survived by her parents, Sara "Sally" Aurandt Lower and Wayne B. Lower of Brooksville; one brother, Timothy Lower of Cleveland; and one sister, Karen Lower Davis of Huntsville.

Sarah C. Malone, 79, of Huntsville died Jan. 8. She retired from the Marshall Center in 1989 as a secretary. She is survived by one daughter, Edith "Bitsie" Rains of Bremen, Ind.; one brother, Ed Gattis of Huntsville; and one sister, Ida Nichols of Chattanooga, Tenn.

Thomas Bynum Turner Jr., 84, of Huntsville died Jan. 4. He retired from the Marshall Center in 1979 as a safety specialist. He is survived by his wife, Lucille Pinkston Turner; one son, Compton Owens of Huntsville; two daughters, Dr. Kathryn Anarss Turner Lettieri and Ramona Love, both of Huntsville; one brother, Jimmy Turner of Mississippi; and two sisters, Mildred Seward of Mississippi and Cleo "Trixie" Lambert of Texas.

UAH, NSSTC to sponsor student science fair March 13-15

The University of Alabama in Huntsville and the National Space Science and Technology Center are sponsoring the 2006 North Alabama Regional Science and Engineering Fair on March 13-15 at the UAH Fitness Center.

The annual contest challenges North Alabama junior high and high school students to devise innovative science and engineering projects and experiments.

Winning entries could earn young innovators entry into upcoming science fairs at the state, national and international levels, as well as scholarships, a trip to Space Camp at the U.S. Space & Rocket Center in Huntsville or a beach vacation at Dauphin Island.

Fair organizers continue to seek university and Marshall Center scientists and engineers to volunteer as judges for the March 14 final competition.

For more information, e-mail university coordinator Yael Marcus at marcusy@uah.edu or call 824-3590.

The science fair is open to the public. For more information, visit the Web site at http://narsef.uah.edu.

Classified Ads

To submit a classified ad to the Marshall Star, go to Inside Marshall, to "Employee Resources," and click on "Employee Ads — Submit Ad." Ads are limited to 15 words, including contact numbers. No sales pitches. Deadline for the next issue is 4:30 p.m. Thursday.

Miscellaneous

Ruger "Old Army" stainless cap & ball revolver, $290. 851-8085

2003 Epiphone Casino, sunburst w/hardshell case, rarely played, mint condition, $570. 746-9080

Aquarium, 150 gallon, stand, lights, filters and heater, $600. 931-6954

Aquarium w/fish, 30 gallon, stand, light, pumps and all accessories, $199. 881-8674

Bose Series I 901 speaker set, $80; Wall gas heater w/tank, 26K BTU/hr, $60. 651-5847

Two Verizon cell phones, Model KYOCERA, plus cases, all for $20. 837-1774

Murray Track 2 Mini Racer mini bike, 3.5HP. 256-355-1542

Three rooms of carpet/padding, 1-1/2 yrs. old, removed from "new" home before furniture arrived, $300. 859-1075

La-Z-Boy leather dual reclining sofa, green, $600. 256-233-7207

Pier 1 china, "Amanda" pattern, 8 place settings, serving bowl and large platter, $150. 256-233-7207

Antique mantel clock by Haller, 16"Wx9"H, $75; Antique two-weight Victorian regulator clock, 56"Hx 20"W, $450. 353-4922

Bassett Cherry entertainment center for 27" TV, slide back double doors, $450. 256-776-4889

Mark V Shopsmith, older model, brown base, books, band saw, other accessories, $435. 880-6146

Contemporary sofa and loveseat, khaki and earth-green, wide stripes, $300. 880-7381

Stroller w/infant carrier, bouncy seat, high chair; Great Dane enclosed trailer, 45'. 256-773-5051

1996 Jayco popup camper, a/c, $1,500. 256-497-3518

Pugs, AKC, 2 males, fawn w/black mask, first shot, dewormed, ready now, $450. 256-882-2037/David

Oak entertainment center, holds 36" TV, matching side pier, both w/recessed lights, $1,100 pair. 829-02852

Dell Inkjet 720 printer, new, $25. 256-479-9762

SWR SuperRedhead professional bass guitar amplifier, 350-450 watts, must sell, $600. 303-3702

Ranch Hand steel brush grill guard, fits 2004-2005 F150, $600. 566-1917

Black leather La-Z-Boy sofa and recliner, $1,000, will sell separately. 539-5886

2002 Shamrock expandable travel trailer, 23', expands to 30', slide, sleeps 8, anti-sway hitch, $10,900. 874-7874

Foosball table game, professional, heavy duty, $175. 653-8311

Vehicles

1991 Nissan 300Z, V6, coupe, 2-door, 5-speed manual, 110K miles, $7,000. 656-2557

2004 Ford Explorer XLT, 4WD, 31K miles, white, 6-disc changer, leather, $19,500. 797-1730

2005 Toyota Camry, 23K miles, automatic, all-power, ABS brakes, silver, $15,000. 461-9305

2001 Jayco travel trailer, 30', queen, 2-bunks, a/c, fridge, heater stove/microwave, awning, sleeps 8, $11,000. 859-0729

1993 Honda CR125 motorcycle, red, white & black, $1,200. 256-214-2427

1997 Ford Ranger XLT, 4-cyl, 5-speed, 86K miles, $4,150. 864-8183

1988 Lincoln Town Car, 112K miles, $1,200. 881-1449

1998 Volvo S90, 4-door, auto, all-power, leather, moon roof, 75K miles, $8,000. 783-6594

2000 Nissan Frontier, 4-door, crewcab, automatic, power, CD/cassette, 101K miles, silver, $9,900. 880-9025

1999 Ford Explorer XLS, 4x4, 82K miles, 4-door, Goodyear tires, towing package, privacy package, $7,300. 353-3229

1980 Jeep CJ7, 4-cyl., 4WD, power soft top bimini and trail cover hitch, $4,000 firm. 883-4177

Wanted

To rent motor home. 509-7907

Golfers for team league playing Mondays at Redstone, contact Jim McEuen. 881-6094

Ride from Byrd Spring/Parkway area to Bldgs. 4619, 4612, 4487 area, 7 a.m.-3:30 p.m. shift. 544-3688

Two tickets for Merle Haggard at VBC. 656-8543

One pair of tickets to the Merle Haggard concert on March 26 at the VBC. 534-5175

Found

Contact lens case w/one lens inside, Bldg. 4600 parking lot, Monday, Feb. 27. Call 544-7038/Michael Karigan

Free

Firewood, on ground, 6"-8" diameter, you cut to length and haul. 679-5400

National Active and Retired Federal Employees Association to meet Saturday, March 11

The National Active and Retired Federal Employees Association will meet at 9:30 a.m., Saturday, March 11, at the Senior Center on Drake Avenue. For more information, call 881-4944 or 882-2406.

"Explorers through the ages . . . "

Emmett Given/MSFC

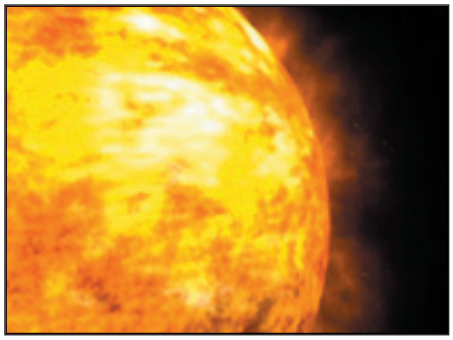
Former NASA astronaut Dr. Roger Crouch talks about his trips into space with students in Sioux City, Iowa, at the base of a monument to American explorers Lewis and Clark. Crouch and representatives of the Marshall Center's Academic Affairs Office were in Sioux City March 2-3 to help kick off the local NASA Explorer Schools Program. The program is a three-year partnership between schools and NASA to foster an interest in science and math and encourage careers in space exploration.

Scientists gaze inside sun, predict the next solar cycle

NASA Headquarters release

For thousands of years, storms from the sun raged around Earth almost without our notice. Ghostly displays of light in the skies over the polar regions were the only evidence of their passing. However, with the arrival of modern technology, they have a much larger impact.

Solar storms can disrupt satellite orbits and electronics, interfere with radio communication and damage power systems. Solar storms begin with tangled magnetic fields generated by the sun's churning electrically charged gas (plasma). Like a rubber band that has been twisted too far, solar magnetic fields can suddenly snap to a new shape, releasing tremendous energy as a solar flare or a coronal mass ejection.



NASA

Coronal mass ejections are violent discharges of electrically charged gas from the sun's corona. The largest explosions in the solar system, CMEs launch up to 10 billion tons of ionized gas into space at speeds of one-to-two million mph.

The sun goes through a roughly 11-year cycle of activity, from stormy to quiet and back again. If we were able to predict the sun's cycles accurately years in advance, we could help societies plan for active bouts of solar storms and lessen their disruptions.

Now, a team of scientists have done just that. They made the first "solar climate" forecast using a combination of groundbreaking observations of the solar interior from space and computer simulation. NASA's Living With a Star program and the National Science Foundation funded the research.

The next solar activity cycle will be 30 to 50 percent stronger than the previous one, and up to a year late in arriving, according to a breakthrough forecast by Dr. Mausumi Dikpati and colleagues at the National Center for Atmospheric Research in Boulder, Colo.

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Vol. 46/No. 24

Marshall Space Flight Center, Alabama 35812
(256) 544–0030
http://www.nasa.gov/centers/marshall

The Marshall Star is published every Thursday by the Public and Employee Communications Office at the George C. Marshall Space Flight Center, National Aeronautics and Space Administration. Classified ads must be submitted by 4:30 p.m. Thursday, and other submissions no later than 5 p.m. Friday to the Marshall Public and Employee Communications Office (CS20), Bldg. 4200, Room 103. Submissions should be written legibly and include the originator's name. Send e-mail submissions to: intercom@msfc.nasa.gov . The Star does not publish commercial advertising of any kind.

Manager of Public and Employee Communications — Dom Amatore
Editor — Jessica Wallace

GPO U.S. Government Printing Office 2006-523-050-20039

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PERMIT NO. 298